

Introduction - Grade 5 Science

The following released test questions are taken from the Grade 5 Science Standards Test. This test is one of the California Standards Tests administered as part of the Standardized Testing and Reporting (STAR) Program under policies set by the State Board of Education.

All questions on the California Standards Tests are evaluated by committees of content experts, including teachers and administrators, to ensure their appropriateness for measuring the California academic content standards in Grade 5 Science. In addition to content, all items are reviewed and approved to ensure their adherence to the principles of fairness and to ensure no bias exists with respect to characteristics such as gender, ethnicity, and language.

This document contains released test questions from the California Standards Test forms in 2004. First on the pages that follow are lists of the Grades 4 and 5 standards assessed on the Grade 5 Science Test. Note that Grade 5 Earth Sciences Standard 3.e is not assessed on the Grade 5 Science Test and, therefore, is not represented in these released test questions. Next are released test questions. Following the questions is a table that gives the correct answer for each question, the content standard that each question is measuring, and the year each question appeared on the test. Reference sheets, provided for students taking the test, are also included as they are necessary in answering some of the questions.

The following table lists the number of items that appear on the exam and the number of released test questions that appear in this document.

STRAND	NUMBER OF QUESTIONS ON EXAM	NUMBER OF RELEASED TEST QUESTIONS
Physical Sciences		
Grade 5 (Standards: 5PS1. a-i)		
Grade 4 (Standards: 4PS1. a-g)	18	4
Life Sciences		
Grade 5 (Standards: 5LS2. a-g)		
Grade 4 (Standards: 4LS2. a-c, 4LS3. a-d)	18	4
Earth Sciences		
Grade 5 (Standards: 5ES3. a-e, 5ES4. a-e, 5ES5. a-c)		
Grade 4 (Standards: 4ES4. a-b, 4ES5. a-c)	18	5
Investigation and Experimentation		
Grade 5 (Standards: 5IE6. a-i)		
Grade 4 (Standards: 4IE6. a-f)	6	2
TOTAL	60	15

In selecting test questions for release, three criteria are used: (1) the questions adequately cover a selection of the academic content standards assessed on the Grade 5 Science Test; (2) the questions demonstrate a range of difficulty; and (3) the questions present a variety of ways standards can be assessed. These released test questions do not reflect all of the ways the standards may be assessed. Released test questions will not appear on future tests.

For more information about the California Standards Tests, visit the California Department of Education's Web site at <http://www.cde.ca.gov/ta/tg/sr/resources.asp>.

THE PHYSICAL SCIENCES

The following 16 California content standards are included in the Physical Sciences strand and are represented in this booklet by four test questions. These questions represent only some ways in which these standards may be assessed on the California Grade 5 Science Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS STRAND

Physical Sciences

Grade 5 Standards

- 5PS1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:**
- 5PS1.a.** *Students know* that during chemical reactions the atom in the reactants rearrange to form products with different properties.
- 5PS1.b.** *Students know* all matter is made of atoms, which may combine to form molecules.
- 5PS1.c.** *Students know* metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; others, such as steel and brass, are composed of a combination of elemental metals.
- 5PS1.d.** *Students know* that each element is made of one kind of atom and that the elements are organized in the periodic table by their chemical properties.
- 5PS1.e.** *Students know* scientists have developed instruments that can create discrete images of atoms and molecules that show that the atoms and molecules often occur in well-ordered arrays.
- 5PS1.f.** *Students know* differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.
- 5PS1.g.** *Students know* properties of solid, liquid, and gaseous substances, such as sugar ($C_6H_{12}O_6$), water (H_2O), helium (He), oxygen (O_2), nitrogen (N_2), and carbon dioxide (CO_2).
- 5PS1.h.** *Students know* living organisms and most materials are composed of just a few elements.
- 5PS1.i.** *Students know* the common properties of salts, such as sodium chloride (NaCl).

Grade 4 Standards

- 4PS1. Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:**
- 4PS1.a.** *Students know* how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.
- 4PS1.b.** *Students know* how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.
- 4PS1.c.** *Students know* electric currents produce magnetic fields and know how to build a simple electromagnet.

- 4PS1.d.** *Students know* the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones.
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- 4PS1.e.** *Students know* electrically charged objects attract or repel each other.
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- 4PS1.f.** *Students know* that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.
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- 4PS1.g.** *Students know* electrical energy can be converted to heat, light, and motion.
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THE LIFE SCIENCES

The following 14 California content standards are included in the Life Sciences strand and are represented in this booklet by four test questions. These questions represent only some ways in which these standards may be assessed on the California Grade 5 Science Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS STRAND

Life Sciences

Grade 5 Standards

- 5LS2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:**
- 5LS2.a.** *Students know* many multicellular organisms have specialized structures to support the transport of materials.
- 5LS2.b.** *Students know* how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO₂) and oxygen (O₂) are exchanged in the lungs and tissues.
- 5LS2.c.** *Students know* the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
- 5LS2.d.** *Students know* the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
- 5LS2.e.** *Students know* how sugar, water, and minerals are transported in a vascular plant.
- 5LS2.f.** *Students know* plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar and release oxygen.
- 5LS2.g.** *Students know* plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO₂) and water (respiration).

Grade 4 Standards

- 4LS2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:**
- 4LS2.a.** *Students know* plants are the primary source of matter and energy entering most food chains.
- 4LS2.b.** *Students know* producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
- 4LS2.c.** *Students know* decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.
- 4LS3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:**
- 4LS3.a.** *Students know* ecosystems can be characterized by their living and nonliving components.
- 4LS3.b.** *Students know* that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

4LS3.c. *Students know* many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

4LS3.d. *Students know* that most microorganisms do not cause disease and that many are beneficial.

THE EARTH SCIENCES

The following 18 California content standards are included in the Earth Sciences strand and are represented in this booklet by five test questions. These questions represent only some ways in which these standards may be assessed on the California Grade 5 Science Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS STRAND

Earth Sciences

Grade 5 Standards

5ES3.	Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:
5ES3.a.	<i>Students know</i> most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.
5ES3.b.	<i>Students know</i> when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.
5ES3.c.	<i>Students know</i> water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.
5ES3.d.	<i>Students know</i> that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
5ES3.e.	<i>Students know</i> the origin of the water used by their local communities.
5ES4.	Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:
5ES4.a.	<i>Students know</i> uneven heating of Earth causes air movements (convection currents).
5ES4.b.	<i>Students know</i> the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.
5ES4.c.	<i>Students know</i> the causes and effects of different types of severe weather.
5ES4.d.	<i>Students know</i> how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.
5ES4.e.	<i>Students know</i> that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.
5ES5.	The solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:
5ES5.a.	<i>Students know</i> the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.
5ES5.b.	<i>Students know</i> the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.
5ES5.c.	<i>Students know</i> the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.

Grade 4 Standards

4ES4. The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:

4ES4.a. *Students know* how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).

4ES4.b. *Students know* how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.

4ES5. Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:

4ES5.a. *Students know* some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

4ES5.b. *Students know* natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.

4ES5.c. *Students know* moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

THE INVESTIGATION AND EXPERIMENTATION

The following 15 California content standards are included in the Investigation and Experimentation strand and are represented in this booklet by two test questions. These questions represent only some ways in which these standards may be assessed on the California Grade 5 Science Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS STRAND

Investigation and Experimentation

Grade 5 Standards

- 5IE6.** Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
- 5IE6.a.** Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.
- 5IE6.b.** Develop a testable question.
- 5IE6.c.** Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
- 5IE6.d.** Identify the dependent and controlled variables in an investigation.
- 5IE6.e.** Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.
- 5IE6.f.** Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.
- 5IE6.g.** Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.
- 5IE6.h.** Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.
- 5IE6.i.** Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.

Grade 4 Standards

- 4IE6.** Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
- 4IE6.a.** Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
- 4IE6.b.** Measure and estimate the weight, length, or volume of objects.
- 4IE6.c.** Formulate and justify predictions based on cause-and-effect relationships.
- 4IE6.d.** Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

4IE6.e. Construct and interpret graphs from measurements.

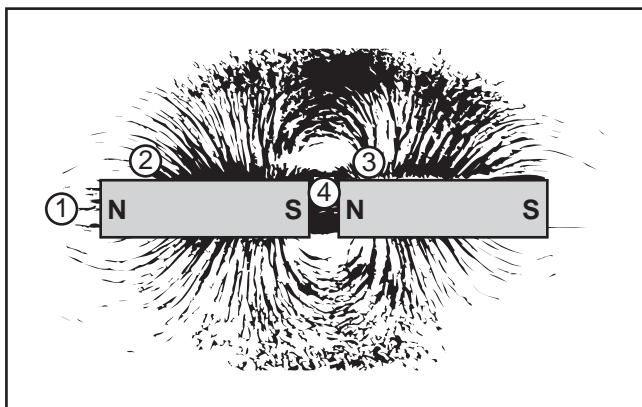
4IE6.f. Follow a set of written instructions for a scientific investigation.

Released Test Questions

Science

5

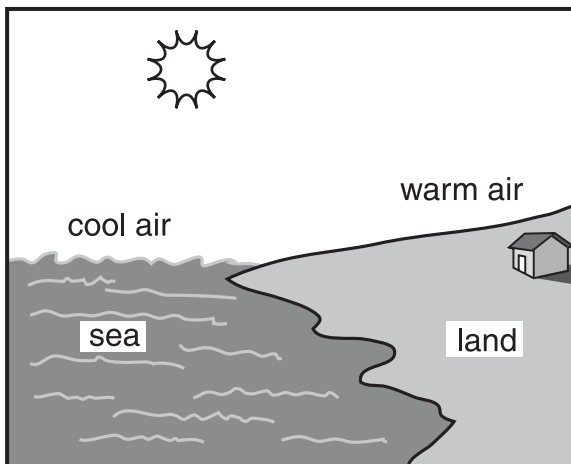
- 1** Sterling silver is a combination of silver and copper. Which of the following is also a combination of two or more metals?
- A aluminum
 - B lead
 - C gold
 - D brass
- 2** A scientist needs to take a picture of the well-ordered arrangements of the atoms and molecules within a substance. Which of the following instruments would be *best* for the scientist to use?
- A a laser light with holograph
 - B a seismograph
 - C an electron microscope
 - D a stereoscope
- 3** Iron filings and bar magnets were placed on a sheet of paper. The following diagram shows the pattern made on the paper.



At which location is the magnetic field the strongest?

- A 1
 - B 2
 - C 3
 - D 4
- 4** Which of the following converts electrical energy into motion?
- A light switch
 - B electric stove
 - C light bulb
 - D electric fan
- 5** Which list gives the correct order of food traveling through the digestive system after it is swallowed?
- A stomach, esophagus, large intestine, small intestine
 - B small intestine, large intestine, esophagus, stomach
 - C esophagus, stomach, large intestine, small intestine
 - D esophagus, stomach, small intestine, large intestine
- 6** Which of the following gases do plants use in photosynthesis?
- A hydrogen
 - B oxygen
 - C carbon dioxide
 - D carbon monoxide
- 7** Which of the following is a living component of a desert in California?
- A low rainfall
 - B hot temperature
 - C polar bear
 - D horned lizard

- 8** Which animals are *most* likely to carry the seeds found in berries from the parent plant to another area?
- A bees
 - B birds
 - C flies
 - D caterpillars
- 9** Where is *most* of Earth's water located?
- A glaciers
 - B lakes
 - C oceans
 - D rivers
- 10** The picture below shows a place where air currents will form due to the uneven heating of Earth.



In which direction will air currents *most* likely move?

- A straight down over the land
- B from the land toward the sea
- C straight up above the sea
- D from the sea toward the land

- 11** Which of these revolves around a planet?
- A an asteroid
 - B a star
 - C a comet
 - D a moon
- 12** Why are *most* fossils found in sedimentary rocks?
- A Sedimentary rocks are not very old.
 - B Organisms live only in areas with sedimentary rock.
 - C Organisms can be preserved in sedimentary rock.
 - D Sedimentary rocks are found only at the surface of the ground.
- 13** A student is trying to identify a mineral that has a nonmetallic luster and is black. It can also be scratched with a fingernail. According to the mineral information sheet, the unidentified mineral is *most* likely
- A mica.
 - B magnetite.
 - C hornblende.
 - D quartz.

Released Test Questions

Science

5

14 Which of the following questions is testable in a scientific investigation?

- A Are dogs better pets than cats?
- B Are dogs happy when they are walked?
- C Are cats more active at night than during the day?
- D Are cats easier to take care of than dogs?

15 The chart below shows the results of an experiment designed to study how exercise affects heart rate.

Activity Stage	Heart Rate of Person A (beats per min.)	Heart Rate of Person B (beats per min.)	Heart Rate of Person C (beats per min.)
Before exercise	75	62	70
After exercise	120	110	130

Which of the following statements is the *best* conclusion for this experiment?

- A Exercise triples a person's heart rate.
- B Exercise decreases a person's heart rate.
- C Heart rate is not affected by exercise.
- D Heart rate is increased by exercise.

Question Number	Correct Answer	Standard	Year of Test
1	<i>D</i>	5PS1.C	2004
2	<i>C</i>	5PS1.E	2004
3	<i>D</i>	4PS1.F	2004
4	<i>D</i>	4PS1.G	2004
5	<i>D</i>	5LS2.C	2004
6	<i>C</i>	5LS2.F	2004
7	<i>D</i>	4LS3.A	2004
8	<i>B</i>	4LS3.C	2004
9	<i>C</i>	5ES3.A	2004
10	<i>D</i>	5ES4.A	2004
11	<i>D</i>	5ES5.B	2004
12	<i>C</i>	4ES4.A	2004
13	<i>A</i>	4ES4.B	2004
14	<i>C</i>	5IE6.B	2004
15	<i>D</i>	4IE6.D	2004

18																			
2																17	10	He	
Helium																Fluorine	9	Ne	
10																Oxygen	8	Neon	
18																Chlorine	17	Ar	
Argon																Sulfur	16	Argon	
36																Bromine	35	Kr	
Krypton																Tellurium	52	Xe	
54																Iodine	53	Xenon	
86																Astatine	85	Rn	
Radon																Polonium	84	Radon	

Grade 5 Science Reference Sheet

Mineral Information

California Standards Test

Mineral Identification Table

Mineral	Hardness	Luster	Streak	Color	Other
Calcite	3	nonmetallic	white	colorless, white	bubbles when acid is placed on it
Feldspar	6	nonmetallic	none	colorless, beige, pink	
Galena	2.5 – 3	metallic	gray	lead-gray	heavy for its size
Gold	2.5 – 3	metallic	golden yellow	yellow	used for jewelry
Graphite	1 – 2	metallic	black	gray to black	feels greasy
Hematite	5 – 6.5	metallic or nonmetallic	reddish brown	silver-gray or red	
Hornblende	5 – 6	nonmetallic	none	dark green to black	
Magnetite	6	metallic	black	black	magnetic
Mica	2 – 2.5	nonmetallic	none	dark brown, black or silver-white	flakes when peeled
Pyrite	6 – 6.5	metallic	greenish black	brassy yellow	called “fool’s gold”
Quartz	7	nonmetallic	none	colorless, white, rose, smoky, purple, brown	
Talc	1	nonmetallic	white	white, greenish to gray	feels greasy

Mohs Hardness Scale

Mineral	Hardness
Talc	1
Gypsum	2
2.5 Fingernail	
Calcite	3
3.0 Copper Penny	
Fluorite	4
Apatite	5
5.5 Glass	
Feldspar	6
6.5 Steel File	
Quartz	7
Topaz	8
Corundum	9
Diamond	10